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THE

CLIMATE OF MADERIA.

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FISHERROW.

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THE CLIMATE OF MADEIRA.

PART I.—MEDICAL TOPOGRAPHY AND METEOROLOGY.

THE island of Madeira lies between the parallels of north latitude $32^{\circ} 49' 44''$ and $32^{\circ} 37' 18''$, and between the longitudes of $16^{\circ} 39' 30''$ and $17^{\circ} 16' 38''$ west. It is about 300 miles west of the coast of Africa. Its length from east to west is about thirty miles, and its breadth from north to south twelve miles. Like the Azores and Canaries, the whole island is obviously of volcanic origin, formed partly by upheavals, but mainly by successive deposits of igneous rocks. Basalt, trachites, lavas, scorïæ, pumices, and tuffs are all met with at different parts of Madeira. The backbone of the island, whose loftiest peaks are about 6000 feet high, slopes towards the sea both on the north and south aspect. Madeira is indeed one mountainous range surrounded by the ocean; nothing but hill, precipice, and ravine; scarcely any level ground; and no seabeach, save at one or two points, where a powerful surf rolls about large pebbles which it has detached from the surrounding rocks. The island thus presents a considerable variety of climates, according to the different elevations and aspects. That of Funchal, which has been most carefully observed, will naturally engage our attention. The population of Madeira is about 100,000, of which 29,000 live in Funchal. This town is situated on the southern side of the island. It is built upon ground sloping towards the sea, and intersected by three deep nullahs, or torrent-beds full of boulders. As their course is little more than six miles, they are generally dry, save after showers of rain, when, owing to the rapid slope, the water goes very quickly away. The widest part of the deltoid area on which Funchal is built covers the shore, extending for nearly two miles. Houses are scattered on the slopes of the hill up to the Mount Church, which is about 2000 feet high.

Funchal is surrounded by a semicircle of hills, upon the lower slopes of which it is partially built. It is thus pretty well guarded from all winds save the south. On the western extremity of the town, towards the New Road, the hills retire a little, allowing some play to breezes from the west. Owing to the rapid deepening of the shore the tides are not very perceptible. The sea is generally calm, but the harbour is indifferent, and affords little protection in rough weather. The forec of the surf makes landing difficult,

though seldom attended with accidents. The vegetation partakes of the tropical character. Bananas, sugar-canes, guavas, custard-apple trees, everywhere meet the eye; and the climate is alike favourable to the vine, the fig, the orange, the apple, the chestnut, the coffee-berry, the pumpkin, the strawberry, and many other fruits both of warm and temperate regions. The flora is principally European, though introduced plants of most climates seem to grow here at one or other elevation. Flowers of brilliant hues grow at Funchal in profusion at every season of the year.

The streets are generally narrow, paved with basaltic pebbles, and, owing to the inequality of the ground, wheeled vehicles are not used. Their place is supplied by sledges, and litters for those far advanced in sickness.

The houses, for a southern town, are well built, and the *quintas*, which are kept furnished for invalids, are roomy and comfortable. Though the walls are not lathed, and there are no ventilators to the floors, they are not so damp as might be expected. Indeed, most of them cannot be called damp at all. The drainage is much helped by the rapid slope; the drains run along the middle of the streets, often at a slight depth from the surface. Trap-doors open into them from the streets, and these are used for throwing in refuse. Nevertheless, it must be acknowledged that Funchal does not in sanitary arrangements rank worse than most towns in the south of France and in Italy. The extraordinary equability of the climate, the rugged beauty of the scenery, and the ever freshness of the vegetation, strike the traveller of the north with admiration; and it is no wonder that, even before Madeira was garrisoned by British troops, its climate should have been recommended for diseases of the chest, which were then regarded in a great measure as confined to cold climates. Madeira was held by the English during the Peninsular war, and the climate thus must have become known to our countrymen. However, its advantages were not made use of until a paper, written by Dr Renton, appeared in the "Edinburgh Medical and Surgical Journal" in 1817, and the observations of Dr Heineken, published in the "Medical Repository" in 1824. This gentleman, who had come to Madeira in 1820, considered dangerously ill of consumption, lived nine years upon the island, but died at last after a cold caught in a storm at sea. Dr Renton, who examined the body, expressed himself astonished how life could have been sustained with so small a portion of the respiratory organs, there being scarcely a vestige of one lung remaining, and the other being in a condition which would not have allowed him to exist in England. Be this as it may, there is no doubt that such lesions are inevitably fatal in Madeira as well as in England. The number of cases who resorted to Madeira was at first few, but about thirty years ago Funchal began to be considered the city of refuge for the consumptive. Assuming the number of permanent residents to be 300, there were about 200 visitors in 1840, as we learn from

Dr Macaulay. In 1845 there were about 250 visitors. In each of the preceding two years, writes Mr Duncan M'Laren, there had been from 300 to 400. From 1845 to 1847 there were about 340 invalids, counting relations and attendants. I have extracted from a species of census which has been kept at the consulate since 1848 the number of visitors and residents. There are considerable variations year by year, but by adding every four years together the decline of the place is made manifest. In 1848-49 there were 373 temporary residents, counting from June to June; in 1851-52, there were 378. The average number for the four years from 1848 to 1852 was 333; for the next four years the average was 252; for the next four, 163; for the next four, 227; then for the next four, 155. The number of residents had also fallen from 276 in 1848 to 153 in 1868. This was partly owing to the decreased number of invalids, and partly to the disease in the grapes diminishing the wine-trade.

The number of invalids of other nations who resorted to Madeira never was very great. Owing to the writings of Dr Mittermayer more Germans have come than formerly; and, indeed, the equability of the temperature would be at once appreciated by a nation so fond of close rooms and so fearful of draughts. Being for the most part recommended by two German physicians who have been in the island, the cases were well selected. According to Dr Schultze, fifty-five Germans and six Scandinavians visited Madeira from 1860 to 1863. A few Americans, Russians, Swiss, and French, make up the invalid population of the place. I have been told that there were about sixty Germans during the winter of 1867-68, and between thirty and forty in 1868-69.

When it is remembered that the number of people who resort to foreign countries in search of health, or to escape the winter, has very much increased since the last twenty years, and that the number of visitors to Nice and the Riviera are to be counted by thousands, this result appears somewhat unsatisfactory. Some people trace it to the new railways giving the invalid a rapid transit through France; but then steam has also shortened the distance to Madeira, and, relatively speaking, the accessibility of the one place has kept pace with that of the other. There is no spot, however remote, that men will not seek for health's sake; and had Madeira answered the expectations with which they sought it, the number of invalids would have gone on increasing instead of diminishing. The real reason in my opinion is, that the nature and effects of the climate have been to a considerable extent misconceived, and that the consulting physicians at home have lost faith in the virtues of the climate of Funchal, owing to the altered views of the medical world upon the treatment of phthisis.

Before entering upon any discussion, it will be better to explain what I believe to be the nature of the climate of Madeira.

The barometric pressure is rather high, being about 30 inches,

corrected for temperature. From the Portuguese Observatory tables, it is highest at 9 A.M., and then sinks till 3 P.M., but is found again to rise at 9 P.M.

There is no question that the climate of Madeira is one of singular equability; the range of temperature between night and day, between month and month, and between season and season, are surprisingly small.¹ Without entering into minute corrections of figures, the remarks of Sir James Clark are still substantially true. He states "the mean annual temperature of Madeira to be $64\cdot56^{\circ}$ Fahr.; the mean difference between summer and winter, $9\cdot38^{\circ}$; mean difference between the coldest and hottest months, $14\cdot50^{\circ}$; the mean difference between successive months only $2\cdot41^{\circ}$; difference between winter and spring, $2\cdot70^{\circ}$; between spring and summer, $7\cdot13^{\circ}$; between summer and autumn, $2\cdot10^{\circ}$; between autumn and winter, $7\cdot73^{\circ}$. The differences of successive months are, between January and February, 1° ; between February and March, $2\cdot56^{\circ}$; between March and April, $1\cdot44^{\circ}$; between April and May, $0\cdot50^{\circ}$; between May and June, 2° ; between June and July, 5° ; between July and August, 3° ; between August and September, $1\cdot50^{\circ}$; between September

¹ The inquiring reader, who wishes to put questions about the meteorological observations, and other matters briefly discussed in this article, ought to consult the following works:—

1. Madeira: its Climate and Scenery. A Handbook for Visitors. By Robert White and James Y. Johnston. 2d Edition. Edinburgh, 1860.—This is by far the best book on the subject; indeed, most of those which followed have been copied from it, in one form or another, with or without acknowledgment.

2. A Treatise on the Climate and Meteorology of Madeira. By the late J. A. Mason, M.D. (inventor of Mason's hygrometer). Edited by James Sheridan Knowles, etc. London, 1850. Pp. 385.—This is the ablest attempt to estimate the character of the climate of Madeira, though the author has fallen into some errors of detail.

3. Noticia sobre o Clima do Funchal e sua influencia no Tratamento da Tisica Pulmonar. Lisboa, 1854. Pp. 347.—This praiseworthy treatise has, I believe, been translated into French by P. Garnier. Paris, 1858.

4. Die Insel Madeira. Von Dr Rudolf Schultze. Stuttgart, 1864. Pp. 146.—This book, principally gleaned from those of White and Barral, is wanting in the mastery of the subject, learning, and diligence which characterize the rich scientific literature of Germany. His assertion that cod-liver oil is a useless medicine for phthisis (p. 3); that where percussion, auscultation, and microscropy fail to make out the diagnosis of phthisis, Hutchinson's spirometer will put an end to all uncertainty (p. 6); as well as the wonderful piece of information that the yearly deaths in France are one to every forty; in England one to every sixty inhabitants; and in London one to every forty; and of these deaths in London one from every five is from phthisis (pp. 113–118),—show how unfit Dr Schultze was to write upon the subject.

Add to this list,—The Climate of Madeira: an Examination of the different Opinions as to its Value in Chest Disease. By George Lund, M.D., of Funchal, Madeira (London, no date). Reprinted from the Association Medical Journal, Sept. 2, 1853.—The Climate of the Island of Madeira. By James Mackenzie Bloxam, Esq. (London, 1854).—Madeira as a Residence for Invalids. By F. D. Dyster, M.D., F.L.S. (London, 1854).—These three pamphlets were provoked by the publication of Dr Burgess's work on the Climate of Italy (London, 1852).

and October, 4° ; between October and November, 4.80° ; between November and December, 2.20° ; between December and January, 1° ." For days together there is no appreciable difference between the day and night, at least in the shade; for the difference between the temperature in the sun and the temperature indoors is much greater than at home—according to Dr Mason it is fully double. Moreover, the range of solar radiation varies much more from day to day, and during the same day, than it ordinarily does in England.

This equability of temperature is dependent upon several circumstances: the situation of Madeira, a small island surrounded by a vast body of ocean; the sheltered position of Funchal from northerly winds; and, lastly, the opposition given to radiation, not only by the clouds, but also by the large amount of invisible moisture suspended in the atmosphere.

The rainy season of Madeira differs from that of India, by occurring at the coldest instead of the warmest period of the year. The rains prevail in October, December, January, and February, with occasional showers in March and April. In June, July, August, and the greater part of September, there is very little rain. The rainfall of Funchal has been pretty well ascertained to be about 30 inches, distributed in the following percentage:—Winter 48, spring 17, summer 4, and autumn 31. The number of rainy days may be 88, but appears to be increasing. This rainfall, about the same as the average of the whole of France, does not far differ from that of the east coast of Great Britain. It is much exceeded in many parts of the tropics; for example, in Barbadoes it is 79 inches; in Jamaica, 103; in Dacca (Bengal) it is 77; in Jessore, 81. In the interior of warm countries, like Upper Egypt or Peru, there is very little rain. The highest rainfall of thirty-two stations in the plains of the Punjab during the year 1867 was Umballa, 38 inches. There were only seven stations on the plains above 30 inches; seven stations below 20 inches; and seven below 10 inches; the lowest being Gogaira or Montgomery, 3.8. But the truth is, neither the rainfall nor the number of wet days will accurately determine whether a climate is wet or dry. Nor is there, even far from the sea, a constant relation between the rainfall and the hygrometer. Dr Mason deduced the mean percentage of aqueous vapour in the atmosphere of Funchal from Dr Heineken's observations as follows:—Winter 77, spring 72, summer 80, autumn 86; their mean temperature being stated by Heineken and Renton as, winter 60.60° , spring 62.36° , summer 69.56° , autumn 67.30° .

Here it is necessary to make a few preliminary remarks about the hygrometric state of the atmosphere, since we have noticed that some distinguished living physicians have fallen into egregious mistakes on this subject. It must never be forgotten that a comparison between the hygrometric scale, formed by a comparison between the wet and dry thermometers, does not give us the absolute humidity

of the air—that is, the amount of moisture in a cubic foot of air. When, therefore, we are told that the percentage of aqueous vapour suspended in the atmosphere at Funchal is 73, all we learn is that the relation between the actual amount of watery vapour and its condition of greatest density, what is commonly called saturation, stands as 73 to 100. But the amount of fluid which the atmosphere can hold is dependent upon the temperature. Neither will the difference between the wet and dry bulbs give us a clear idea, unless we have also the known degree in the thermometric scale. Take, for example, 50° , the mean temperature of Torquay, and assume that the dry and wet bulb thermometers stand at 50° and 45° ; then take 66° , the mean temperature of Funchal, and assume the dry and wet to stand at 66° and 61° , it is clear the difference between the two bulbs would be the same—namely 5° ; but the degree of humidity would be 68 for Torquay, and 73 for Funchal. Then the amount of fluid in each cubic inch of air would be 2.8 grains for Torquay, and 5.1 for Funchal. In the same way, a height of 67 in the hygrometric scale (saturation being 100) would denote that there were .6 of a grain in a cubic foot of air at 10° dry bulb and 9° wet bulb. But if the temperature stood at 49° dry and 44° wet, the degree would still be 67, but the fluid would be 2.7 grains; at 99° dry and 91° wet, the degree would still be 67, but the moisture in a cubic foot of air would weigh 13 grains.

Mr Maekenzie Bloxam, in opposition to Dr Burgess, insists that there is a material difference between air at saturation at 50° and air at 68° , both holding in suspension the same amount of moisture, as the higher temperature enables the air still to take up as much more; and this would be quite *à propos*, if we were reasoning about the drying of a shirt on a hedge; not so when we come to treat of the physiological action of heat and moisture upon the living body.

Air, moisture, and heat act upon the lungs and skin; the air, entering the minute vesicles of the lungs, becomes loaded with moisture to saturation, and is, ere it is expired, raised to the height of the bodily temperature. Now, if air at saturation at 50° enters the lung, it will be able to take up a great deal more aqueous vapour from the blood than it would do if it were already saturated at 68° ; and again, if a man were to breathe air saturated with moisture at the temperature of 99° Fahr., it is clear that no exhalation of watery vapour would come from the lungs at all, nor would the inspired air allow any addition to its temperature. The lungs exhale a considerable amount of watery vapour, ranging from 6 to 27 ounces; the mean quantity varies between 16 to 20 ounces. Moreover, the lungs exhale not only carbonic acid, but some imperfectly oxidized albuminous compounds, and there is reason to believe that these processes cannot be arrested or diminished without affecting the economy to a considerable extent. Dr Mason distinguishes carefully between cutaneous evaporation—a physical phenomenon which would go on even in the dead body—and

perspiration or the secretion of the sudoriparous glands. When the former of these processes—the physical evaporation of moisture—is checked, by the body being immersed in humid air at a high temperature, the vital act of perspiration is increased, and the sweat poured forth abundantly from the open mouths of the sweat glands; hence the two processes stand in a certain ratio to each other, but the perspiration is not poured out in any abundance until the temperature is raised to above 68°. One thing, however, admits of no doubt, that a continual transpiration of moisture takes place from the skin, which, heated up to the temperature of 97°, with its radiation obstructed by clothing, causes the sweat to be removed by a constant process of insensible evaporation. The presence of moisture in the air impedes the process in proportion as the air is saturated up to the temperature of the body. If the body is surrounded by air of its own temperature, but very dry, evaporation will take place with great rapidity, and the surface of the skin be cooled. On the contrary, if the air is at or above the temperature of the body, and saturated with moisture, the power of regulating the animal heat possessed by the skin will be destroyed.

The skin gives off a considerable proportion of fluid as well as the lungs; but it is evident the suppression of perspiration cannot be perfectly replaced by any extra activity of the pulmonary exhalation, since animals in which the cutaneous perspiration is artificially arrested soon die with a remarkable sinking of the temperature of the body.

Moisture in the air at a high temperature tends to arrest the passage of vapour from the lungs, and to diminish the rapidity of the superficial evaporation, and the *vis a tergo* force of the sudoriparous tubules; hence the sense of oppression and suffocation caused by moist heat.

At first people believed that the climate of Funchal was a dry one, probably from the rareness of dew, owing to the equability of the night temperature; nevertheless the humidity of the climate could very well be made out by an attentive observer without the use of instruments. Iron rusts speedily, shoes or boots put out of the way are soon covered with a fungus mould, and salts rapidly deliquesce. Dr Macanlay¹ “noticed the great difficulty of drying and preserving his botanical specimens, as compared with experience in other places.” The observations of Dr Heineken, however, might be considered to settle the question, and are still worthy of being consulted. Other observations upon the moisture of the air have been contributed by White, Barral, Mittermayer, and others. Heineken’s results were taken from one daily observation at 10 A.M., during the year 1826; Mr White’s are the mean of three daily observations, at 9 A.M., 2 P.M., and 7 P.M., during 1850-51; and

¹ Notes on the Physical Geography, etc., and Climate of the Island of Madeira (reprinted from the Edinburgh New Philosophical Journal, October 1840), p. 30.

Barral's of three observations, at 7 A.M., 2 P.M., and 7 P.M.; Azevedo's from four observations at the Observatory, 1867. Let us now consider the temperature and humidity of the seven months which visitors generally spend on the island.

	Heineken.		White.		Barral.		Azevedo.	
	Mean Temp.	Humidity.	Temperature.	Humidity.	Temperature.	Humidity.	Temperature.	Humidity.
October . . .	66·76°	84	70·58°	74	68·21°	71·3	74°	63·3
November . .	63·96	87	66·85	71	65·81	73·3	65	77·5
December . .	61·44	82	62·80	75	61·50	75·2	61	73
January . . .	59·71	70	62·18	73	60·40	73·5	61	75·7
February . . .	60·28	72	64·94	75	57·57	69·1	63	63·4
March	61·86	66	64·63	69	59·93	68·7	63	72·6
April	62·03	65	68·35	72	66·85	70·6	64	61·7
Mean of 7 months	62°	75	65·8°	72	63°	71	64·4°	69·6

Thus, according to Heineken, we have a mean temperature of 62°, with a mean humidity of 75, giving 4·5 grains of aqueous vapour in a cubic foot of air, or saturation at 53°. By Mr White's observations we have a mean temperature of 65°, with a degree of humidity of 72·7, giving about 5 grains of vapour to the cubic foot, or saturation at 56°. According to Barral, we have a mean temperature of 63°, a mean humidity of 71, giving 4·5 grains of aqueous vapour to the cubic foot, or saturation at 53°. From Colonel Azevedo's observations at the Funchal Observatory 1867,¹ we have a mean temperature of 64·4°, a mean humidity of 69·6, giving 4·6 grains of vapour, being saturation at 53·5°. There is thus no question that the amount of moisture in the air of Madeira is considerably greater than what it could be at home.

The mean annual amount of moisture in England, for twenty-seven years' observations made at Greenwich, is 3·4 grains. For the seven highest months it is 3·9, and England is not generally regarded as a country with too little moisture. It is in the most humid localities that phthisis is most frequent, and the driest ones are regarded as the best abodes for consumptive invalids.

During the year 1861, the humidity of Scotland, according to Oliver and Boyd's Almanac, was declared excessive—it was 86, the mean temperature being 46·9°. This would give about 3·2 grains of moisture in the cubic foot of air.

The mean temperature of Torquay is about 50°, the humidity 76, giving about 3·1 grains of moisture in the cubic foot; yet Walshe, in his "Diseases of the Chest," declares Torquay to be moister than Madeira, which is physically impossible. Moreover, during the winter, the mean temperature of Torquay is only 44°,

¹ These will be referred to further on. Mittermayer published no observations for October and November—his results do not substantially differ from the rest. In calculating the amount of vapour in the air, I have used Glaisher's tables, and have occasionally cut off awkward fractions.

which, saturated, could only contain 3·1 grains. The Azores are generally treated as the most humid of the European winter climates, and no doubt they stand higher in the degree of relative humidity. In the tables published by the Portuguese Government,¹ we find Reports of Meteorological Observations from January 1867 to May 1868, from which I have calculated that the absolute amount of moisture in the air, indicated by the dry and wet bulb thermometers at Ponte Delgada, St Michael's, and Funchal, almost exactly tallied during the seventeen months of which we had reports.² No doubt, to a popular observer the climate of the Azores—like Madeira, a very equable one—must appear damper, because, owing to the lower mean temperature and the range more frequently passing the dew-point, there must be a much greater deposition of dew, and more mist and drizzle than at Funchal. At Teneriffe, however, the climate is drier. In the account published by Chambers³ of a visit to that island in November, two observations made with the hygrometer, in two several days, marked the dew-point 41°, the thermometer “75°, giving 34 of dryness” and 2·8 grains of moisture, “a state only once remarked by Dr Heineken during a nine years' stay in Madeira. The day after it marked 40°; this latter is a rarity, but the former is very common throughout the year.”

On the other hand, Cidade da Praia, in the Cape Verde Islands, with a lesser degree of relative humidity (the mean being 52 to a mean temperature of 80°, for seven months from January to July 1865), but with a higher temperature, contains about one-eighth more moisture than Funchal. Except during the rainy months which occur in the hot season, the air of the Punjab, which lies in about the same latitude, is much drier than Madeira.

It is difficult to measure the quantity of ozone at different places, different barometric pressures, and different states of moisture and motion of the air, not to mention the vicinity of human dwellings, for ozone is always deficient in the middle of large towns. Taking into consideration the temperature and humidity of the air of Funchal, the quantity of ozone, as tested in the scale of Berigny, appears to be moderate. It is less than at Ponte Delgada and Angra do Heroismo, but greater than at Campo Maior.

No doubt the amount of moisture in the air at Funchal is variable. In the year 1834 there was an unusual continuance of wet weather. This explains the large amount of moisture found in the air by Dr Mason's careful experiments, which gave nearly the double of the

¹ *Annaes do Observatorio do Infante D Luiz* volume terceiro 1865, No. 4—Março a Novembro. Lisboa, 1866.

² The height of the Observatory at Ponte Delgada is given at 20 metres, that of Funchal at 25 metres; hence it is likely that the atmosphere there is absolutely drier than at Funchal.

³ Chambers's *Miscellany of Useful and Entertaining Tracts*, No. 64—A Visit to Madeira and Teneriffe.

quantity found by Mr M'Euen in 1848. I attach little importance to the objections made against the placing of the instruments of an expert meteorologist like Dr Mason. It would be tiresome to discuss the question. From Dr Lund's observations, it appears that the amount of moisture in the hills during the summer is very considerable; for even when there is no rain, the increased power of the sun brings additional moisture from the surrounding sea. The following are his observations, made in 1850 at Santo Antonio da Serra, 1910 feet above the level of the sea.

				Dry bulb.	Wet bulb.	Weight of vapour.
June. .	{	9 A.M.		64·33°	59·25°	5·2 grains.
		2 P.M.		64·92	59·16	5·1 "
		7 P.M.		58·75	56·42	5·1 "
July. .	{	9 A.M.		65·77	60·53	5·4 "
		2 P.M.		65·68	60·63	5·4 "
		7 P.M.		61·95	57·92	5·2 "
August	{	9 A.M.		65·19	58·92	5·1 "
		2 P.M.		67·20	61·02	5·4 "
		7 P.M.		63·04	57·52	4·8 "

Mists are not uncommon in the hills during summer, but rain is not very frequent.

Funchal, like most maritime places in southern latitudes, has a sea and a land breeze morning and evening. During the rainy season these are not very regular. The best weather comes with the north and north-east wind: the south or the south-west wind brings rain; the north-west, cold and rain.

The *leste* is a dry wind blowing from the African coast. It raises the temperature, but seldom much higher than 80°. While it blows, it is hotter at a considerable elevation in the hills than at Funchal, probably because the lower flights of the African sirocco have been cooled by evaporation from the surface of the intervening ocean. Dr Mason observed during *leste* a difference of 22·5° between the dry and wet bulbs, and Mr M'Euen a difference of 21°, showing only 18 per cent. of moisture in the atmosphere. There was one while I was in Madeira with a difference of 17° between the two bulbs. The *leste* does not often blow during the cooler months, and seldom lasts more than three days. Dr Mason considered that if it disagreed with a person, it was a sign that Madeira agreed with him. I have not been able to make out that experience has confirmed Dr Mason's rule. Invalids sometimes suffer severely from it—an undescribable uneasiness, which some try to relieve by going out in a boat.

It may perhaps appear ungracious to make remarks in any way lowering to the worth of observations whose value I appreciate highly, and which were communicated to me in a most kind and courteous manner; nevertheless, few will deny that the situation of the Observatory at Funchal might in some respects be improved.

The present observatory is above the bastion of the gate, in the fort near the sea, looking over the Praça da Constituição. The instruments are in a small square tower about 8 feet by 8, and perhaps as many feet high from floor to roof. The windows open like two doors, meeting at the middle, as is customary on the Continent; they are guarded by Venetian blinds, as is the upper part of the door which admits the air. The wet-bulb thermometer hangs on the wall, between the door which looks north and the window which looks west. The whole tower is open to every wind that blows, and must be in a continual draught or swirl, causing the wet bulb to evaporate more rapidly. The reverberation of light from the whitened wall must fall upon the air thermometer. The tower is about 25 metres above the sea, and perhaps 40 feet above the ground. It is hardly necessary to remark, that this will diminish the contents of the rain-gauge, and prevent an accurate comparison between such observations as those of the Scottish Meteorological Society, which are taken from instruments placed about four feet above the ground.

By actual comparison of thirty-three observations made by Dr Lightbody, at Reid's Hotel, about the same elevation of soil, but four feet above the ground, there was found to be 6·2 grains more moisture, or $\cdot33 = \frac{1}{3}$ of a grain per diem, at the lower elevation. The comparison with observations made in another locality by Miss Ivory at Quinta Jasmineiros, also proved the moisture was greater near the ground.

As will be noticed, French instruments and scales of measurement have been used in the following Table, nor have I ventured to change them.

Abstract from Meteorological Report of Observations taken at the Observatory in Funchal, 1867.

	Maxima media. C.	Minima media. C.	Mean. Temp.	Range of month.	Deg. of relative humid.	Barometer.	Ozone.	Days of rain.	Rainfall in milli- metres.
January . .	19·13	14·91	16·84	8·8	75·7	761·55	8·8	15	216·1
February . .	20·04	14·69	17·46	12·0	63·4	767·17	6·6	3	10·5
March . . .	19·61	15·15	17·26	8·6	72·6	758·05	8·1	18	158·7
April . . .	23·7	15·38	18·03	8·7	61·7	764·71	6·6	0	0
May	20·58	16·21	18·40	7·0	65·	761·85	7·2	7	22·2
June	22·04	18·07	20·13	6·6	68·5	762·95	6·1	7	28·9
July	23·74	19·82	21·91	7·1	69·1	764·28	5·0	0	0
August . . .	24·54	20·12	22·56	6·2	67·5	763·52	4·7	0	0
September .	24·30	19·22	21·90	8·0	64·3	763·73	5·7	4	13·4
October . .	23·0	17·59	23·6	9·5	63·3	762·99	6·7	8	44·1
November .	25·1	16·18	18·36	8·8	77·5	759·56	9·0	18	358·4
December .	18·53	13·69	16·03	12·3	73·0	761·05	8·5	21	61·2

PART II.—VITAL STATISTICS AND EFFECTS OF CLIMATE UPON DISEASE.

As Madeira at its discovery in 1419 was uninhabited, it was at once peopled by Portuguese settlers; but many slaves were carried away from the African coast, who, in the course of time blending with the Portuguese, produced a race evidently a mixture of the European and African, principally Moorish, though in many cases European blood has remained almost pure.

According to Barral, the annual mortality is one in 39, or, more correctly, one in 38·9; in France it is one in 44·5; in England, one in 46; in Scotland, one in 49.

The people are more robust in the northern than in the southern side of the island, and stronger in the hills than on the coast. The manner of life of these islanders is simple. They are generally very poor, and live in great part upon fish and vegetable food, such as maize, wheat, potatoes, pumpkins, yams (*Colocassia esculenta*), sweet potatoes, and fruit. As usual in hot countries, the women begin to fade more early than with us; menstruation begins about the fifteenth year. The principal diseases, at least about Funchal, are acute and chronic hepatitis, rheumatism, scrofula, and continued fevers; cancer and apoplexy are also common, and indigestion among the upper classes. Bronchitis, pneumonia, and pleurisy, are not so rare among the poorer classes as might be expected from the mildness of the climate. Leprosy occurs, especially amongst the poor peasants on the south-western coast of the island; it is regarded by the Portuguese physicians here as hereditary and not contagious. Elephantiasis Arabum is rare. Leprosy frequently ends by spreading to the trachea or bronchial tubes.

The cholera appeared here in 1856, and destroyed one-tenth of the inhabitants.

The question whether phthisis was frequent in Madeira has naturally created some interest. Dr Gourlay,¹ while believing that the climate of Madeira was beneficial to strangers with chest complaints, stated his opinion that there was no affection more frequent among the natives of the island than phthisis, and that persons of all classes and both sexes became its victims, and sometimes whole families were destroyed by it. He also says that it was more rapid in its progress than phthisis in the colder parts of Europe. Dr Lund remarks, that auscultation was not known in the time of Dr Gourlay; nevertheless, it appears to me that Dr Gourlay understood perfectly well the nature and symptoms of phthisis. Incipient phthisis might no doubt escape the diagnosis of an experienced

¹ See his opinion cited by Barral, p. 172. Dr Gourlay's work is entitled "Observations on the Natural History, Climate, and Diseases of Madeira, during a period of eighteen years. By William Gourlay, Physician to the British Factory at Madeira." London, 1811.

physician of the beginning of this century, but I cannot see how he could fail to distinguish nine out of ten of the matured disease from chronic bronchitis or pleurisy. Dr Renton writes, "With respect to the question relative to the frequency of consumption among the natives, Dr Gourlay, if he alluded to tubercular disease" (which he did), "has greatly overrated it."

Dr Heineken was of the same opinion as Dr Renton. Dr Lund gives none of his own, but apparently endorses that of Mr White, "that scrofula and consumption occur among the natives of Madeira, but less frequently than in more changeable climates." Dr Dyster remarks, with regard to the frequency of phthisis among the Portuguese, "I am disposed to believe it greater than Dr Renton supposed." He believed that this was owing to the increased poverty of the people, to hard work, scanty food, insufficient clothing, damp windowless houses in the mountains, and dark dirty ones in the towns.

Speaking of Madeira, Dr Mason remarks, "that consumption and scrofula are frequent there, and few places will be found where the system is more liable to disorder; whilst I suspect that the average duration of life is inferior to that of our own country. Dr Bowie also, a lamented friend who has ceased from among us, thus wrote to me¹ but a short time before he proved in himself the inability of the Madeira climate to check the progress of consumption, 'Phthisis is frequently met with amongst the natives of Madeira, who are, generally speaking, a highly scrofulous community.'" Some statistical details, got up by Dr Pitta, a Portuguese physician in Madeira, with the view of proving consumption rare in the hospital at Funchal, have been very properly rejected by Dr Mittermayer and Dr Schultze as "unzuverlässig." Among twenty-eight bodies of natives which Dr Mittermayer² dissected at Madeira, the half of them had tubercle in the lungs. In two of these fourteen the disease had healed, in five it was in progress with other diseases, in seven it was the cause of death. Unfortunately, there are not trustworthy statistics on which this question could be decided. Owing to the extreme poverty of the inhabitants, hundreds of people die without being seen by a regular practitioner; and we are convinced from our own trials that, as the influx of visitors from the north is a source of wealth to the inhabitants, it would be impossible to collect statistics tending to throw discredit upon the sanatory fame of the island. Such was evidently the opinion of the Portuguese Dr Barral. "We can certify," says he, "from our own experience, that positive and satisfactory data are not easily obtained, even by those who are more happily situated for making them." From the information he actually got from Portuguese practitioners in Funchal, he believed that the disease "is not rare (*não é rara*), but there were fewer cases than in other countries." Dissatisfied with

¹ Dr Cotton on Consumption, 1858, pp. 244, 245.

² Dr Schultze, *op. cit.*, p. 118.

the vagueness of such information, he compares the number of hospital admissions in Funchal with those in Lisbon. The mortality from phthisis was about 1 in 24; but the number of admissions does not bear a regular proportion each year as at Lisbon, but doubles or nearly trebles in alternate years.

It has been argued that phthisis must be rare here, since only ninety-seven invalids tried to gain admission into the Consumption Hospital and that of Misericordia in two years. Yet I question whether there were more than a dozen of applications to the Dumfries and Galloway Royal Infirmary during the seven or eight winter months I was house-surgeon, the cause being the same both in Galloway and Madeira—the dislike of the people to enter an hospital; and yet no one can assert that phthisis is rare in the counties of Dumfries, Kirkcudbright, and Selkirkshire, which have a population considerably greater than Madeira.

As far as my own inquiries go, I believe that phthisis and serofula are common at Funchal, and that their ravages are by no means confined to the poorer classes. Dr Schultze expresses a similar opinion. It is quite possible that the climate of a place may be favourable to strangers suffering from diseases to which the inhabitants are themselves liable; nevertheless, few will be disposed to think that this discussion has no bearing upon the subject.

A due regard to space prevents me either reproducing or analyzing the statistics which have been published upon Madeira. Those of Renton and Lund are much more favourable than the cases of the patients sent out from the Brompton Hospital.

Disposed to set a high value upon the climate of Madeira, I imagined, ere I resided there, that the difficulty of procuring exercise upon horseback, or the assumed impossibility of walking about under a powerful sun, accounted for the unfortunate result of the Brompton experiment; but the truth is, the climate will very well allow of a sufficient amount of exercise being taken on foot in the morning and evening, and that the cloudiness of the sky very much and very often interferes with the power of the sun during the day. These patients were treated with great care and kindness, and everything was done to please and comfort them. It was also objected that the cases were of too advanced a character; yet Dr Lund claims five cases where the disease was arrested, and two much ameliorated out of twenty-four in the second stage; and Dr Schultze expressly says (p. 136) that the merits of a climate must rest upon the number of open vomicae it brings to calcify or cicatrize, and the number of cases of softening it causes permanently to improve. As the results of all the statistics collected by him, Dr Schultze claims for Madeira that, out of every five cases of phthisis in the second stage, three have found an enduring improvement (*eine andauernde Besserung fanden*), and believes, too, that, with better care and treatment, we might have four cases of healing out of five. So that, instead of the Brompton Hospital patients returning as they

did,¹ sixteen, or at least twelve, should have come back with the disease arrested.

In treating disease, every man sets out with some theory or other, and there are two methods of viewing phthisis which ought to be present to our minds. The old view was, that phthisis was an inflammation of a low or serofulous character, which ought to be combated by cautious antiphlogistic measures, such as small bleedings, and that it was a disease of cold countries apt to be provoked by catarrh and pleurisy. Exposure to cold was, above all things, to be guarded against. "The most important measure that can be advised," writes Professor Alison as late as 1844, "in cases of threatened, suspected, or incipient phthisis, is a change of climate, either to the south of Europe or Madeira, or strict confinement within doors, in an artificial climate as near as possible to 60° of Fahrenheit, during at least six months of the year in Britain." This view is still the favoured one with patients themselves. Admitting that they have "a delicate chest," they are fond of considering the malady as simply a succession of fresh colds, and shut themselves up more and more the worse they get. It is often the duty of the physician to insist on the necessity of greater exposure rather than of greater care. The present view of phthisis is, that it is a constitutional disease affecting the functions of assimilation, the result of a depressed state of health, and frequently caused by heated air, close rooms, and sedentary occupations. It has been proved by statistics that it is more than twice as common in Marseilles, Gibraltar, and Malta, than in Stockholm, Berlin, or even than in London, and that it is very rare in Iceland, which is perhaps owing to the fishy and oleaginous diet of the inhabitants. It is some confirmation of this view that the Acadians, who live at the mouth of the St Lawrence, subsisting in great part upon the cod, are, according to M. Landry, almost entirely exempt from phthisis. In this disease the influence of diet is of greater importance than the influence of climate.

Phthisis is undoubtedly rare in Canada, and in India, both with Europeans and natives; and the reports of the mortality in the jails show it to be much less frequent and less deadly in the more bracing regions of the Punjab than in the plains of Lower Bengal, where the climate is much more equable and humid.

To restore the health and vigour of the body by tonic and bracing regimen is regarded as the first indication. The patient is directed in standard text-books rather to walk out in the snow and the rain than to want adequate exercise. The assumed necessity of venturing out only in fine weather, and "often with a respirator," is regarded as a mere delusion; and it has been proved that phthisical invalids bear well the dry cold of Canada and Minnesota.

¹ The result is thus given by Dr Thorowgood in his able little treatise on the Climatic Treatment of Consumption, London. 1868, p. 4. "Two of the twenty returned improved, seven were slightly improved, twelve were no better and no worse, five were made worse, and one died."

It is not capable of dispute, that, since the adoption of such views, the duration of phthisis has been prolonged, and the number of recoveries has become greater.

The supposed necessity of an equable temperature dominated the minds both of the friends and assailants of the Madeira climate. Around this all facts were grouped, and with this all objections were answered. Dr Renton accounted for the loss of many of his cases by their ascending to the heights and breathing air ten degrees colder than at Funchal, and thus deranging the equability of the climate. Dr Lund witnessed "in cases very recently landed, and where the physical signs have been exceedingly slight, rapid and extensive tubercular deposit ensue in the lungs from excesses, combined with imprudent exposure to the midnight air. Slight catarrh has come on, and this fixed irritation has appeared to be all that was necessary to cause a rapid accumulation of the deposit in the lungs." Nevertheless, the difference of temperature between the midnight air and that during the day is seldom marked, especially to those recently arrived; and though it seems reasonable to admit that inflammation favours the deposit of tubercle, it is scarcely fair to insist upon slight catarrh as the cause of rapid tubercular exudation, instead of its necessary accompaniment. This is a favourite method of reasoning in Madeira; yet, though I always cautioned my patients against exposure to night air, and especially to draughts, I never observed those who took what was called "great care of themselves," get on better than other people—sometimes the reverse.

Even those who attacked Madeira like Dr Burgess tried to deny the equability of the climate. It appears to me from actual experience, that warm air, even at nearly the same temperature, has a relaxing effect upon the frame, diminishes the appetite, and depresses the spirits. Dr Combe, whose favourable opinion on Madeira is so often cited, remarks:—"The climate is somewhat relaxing from its humidity and equable temperature, and in summer must be so to a still greater degree." My experience in India, especially at Kussouli, has convinced me that patients do not recover well during an equable temperature, and that a considerable range during the day and night is of advantage to most constitutions. Dr F. Smith, in his thoughtful work called "Cyclical Changes," has pointed out with great clearness the effects of those variations of temperature which we call seasons, and their influence in keeping up the balance of vital forces, actions, and reactions necessary to health; and though it is no doubt true that sick people must often be guarded against what would do them good in ordinary health, even in pulmonary complaints, the advantage of equability of temperature has been much overrated. "Theoretically speaking," says Dr Walshe,¹ "steadiness of temperature from day to day, with but slight nocturnal fall of the thermometer, ranks as a very important condition; but practically it turns out to be comparatively

¹ Diseases of the Lungs, 1860, p. 588.

insignificant. For those elimes, Egypt and Australia, which furnish from time to time the most striking examples of arrest of phthisis in individuals of the Saxon and Celtic races of North Europe, are glaringly deficient in this element of theoretical success." It can scarcely fail to strike a close observer how readily an unusual, though apparently insignificant, variation of the thermometer, especially if accompanied by wind, causes colds and rheumatisms amongst those who have been some time in Funchal. This has already been noticed by Dr A. Combe in Madeira; and the same remark has been made by A. Von Humboldt, in a similarly equable climate in South America. There is no question that moisture adds to the debilitating effects of heat, that hot and dry climates are much more favourable to the development of the human frame, especially of the Aryan and Semitic races, than where an equal or even inferior degree of heat is conjoined with moisture, and this independently of the action of paludal miasmata. I have seen the enervating effects of the addition of moisture to heat very well exemplified in actual field-service in India. Dry heat is much better borne than moist heat, and the reaction during the night is much greater. Amongst the invalids at Madeira the driest weather is the most healthy; those heavy days, loaded with five to seven grains of moisture to the square foot, where the wet and dry bulbs of the thermometer sometimes indicate absolute saturation, are depressing both to the health and spirits of the invalids. The extremes of moisture generally occur in rainy weather, which is common, especially in January, November, and December. The clouds swaying from the south-west are arrested by the hills above the Mount Church. The mist descends lower and lower, and is frequently accompanied by rain. The sky at Funchal is much more frequently overcast with clouds than in any southern climate in which I have lived, though the winter of 1868-9 was an unusually dry one.

Since 1852, when the grape disease appeared, the vines have been replaced by sugar-canes, which require to be watered much more frequently. Every drop of rain is made to flow into the *levadas* or aqueducts, hoarded up in the tanks, and distributed at regular intervals by a capillary network of channels and gutters to the cane plantations, which cover the whole basin of Funchal. On every side the *quintas* are surrounded by acres of sugar-canes, even the gardens in the town are full of them. This form of cultivation is very remunerative, owing to a protective duty upon foreign sugar; and as long as the duty is maintained it will not readily be abandoned, round about Funchal, where the system of irrigation is more perfect than in the neighbouring hills, upon whose slopes the vine is beginning to reappear. It is perfectly clear that this irrigation must have increased the humidity of the air, especially in the suburbs of Funchal; and some old residents are disposed to attribute the decline of the place to the substitution of the sugar-canes for

the vine. A form of low fever, occurring in March and April after they are cut down, is said to be commoner than formerly; it is probably of miasmatic origin. Intermittent fever is not often met with in Funchal. It may admit of question whether irrigated soil be a cause of phthisis, like ordinary impervious and wet soil; but certainly any sagacious medical man would remove these canebreaks if he could.

I shall give my opinion on the merits of the climate of Funchal as briefly as possible.

The main reasons of my leaving it were that it did not agree with my health, that the place was evidently declining, and that I could not, as I had hoped, take up my pen to write in favour of it, and endeavour to attract patients to it. Nevertheless, some good may result from my attempting to point out the cases that suit it and those that do not. Had I stayed longer than one season I might have been better able to do so; though it was clear to me, that a physician cannot successfully practise in a sanatorium upon whose merits he looks coldly, and to which he cannot advise his patients to return the next winter. Invalids require to be fed upon hopes—false ones, if no better can be had; and sordid interests when offended are madly evil spoken.

The ordinary effect following upon a stay at Funchal is a considerable diminution of appetite and physical energy. Diarrhœa is frequent with new comers; in general it is easily treated; but occasionally, especially in advanced cases of phthisis, it helps powerfully to accelerate the fatal issue. In one case of bronchitis and emphysema it did much harm, without the chest affection being benefited. The liver also is apt to get out of order.

The children of British residents here are in general feeble and anæmic, but the mild climate seems to do well with old people.

Most of the advocates of Madeira wish phthisical invalids to be sent as early as possible; but consulting physicians are now, as may be imagined, very chary of so doing. Dr Lund stated the ordinary duration of phthisis in England to be from eighteen to twenty-four months. Is this true of the wealthier classes? The great proportion of invalids who reach Funchal are cases of three or four years' duration. Nevertheless, incipient cases occasionally do well here, though there is no proof that they do better than in England. Cod-liver oil is a much more powerful remedy than the air of Funchal, and it is always a question which is to be preferred; for cod-liver oil can only be taken in much smaller quantities in Madeira, and is more apt to derange the appetite—often it cannot be taken at all.

I was once called to diagnose the case of a young lady who accompanied her father (who was suffering from phthisis, though not an advanced case) to the island, where she had now lived two years. Her mother had died of the same disease, and she had suffered from otorrhœa, otherwise she was a fine well-grown girl. Her father

was perfectly sure that she had no consumption on landing, and for a year after; nevertheless, she had now been ill for a year, and had a cavity of considerable size on the apex of the left lung.

I saw another case of phthisis, in which I traced the deposition of tubercle from the beginning. Under the depressing influence of affliction it went on with more than ordinary rapidity. There was another case of phthisis in a resident—I believe it was hereditary on the father's side;¹ and I myself treated two cases of *ophthalmia tarsi*, where the scrofulous diathesis was strongly marked in two young people of English parents born and brought up at Funchal. In these cases there was no hereditary transmission. I had authentic accounts of several other cases of phthisis, some hereditary, others not, which began and ran to a fatal termination amongst the English residents at Funchal, though I fancy nobody ever took the trouble to publish them. I have not observed any cases of phthisis in Funchal last winter where there was anything like clear evidence that the disease was arrested, and few cases of improvement. In some patients under my care, the deposition of tubercle went on with considerable rapidity. It seemed to me that the clinical history of the case, borne from the south of France or the south of England, or elsewhere, was not altered or modified to any remarkable degree; rapid cases went on rapidly—slow cases slowly. Hæmoptysis is common in Madeira. This was the subject of universal remark. It may be owing to people retaining a stimulating and highly animalized diet in a semi-tropical climate.

The silly habit of weighing patients is kept up at the hotels, and leads to over-eating and crapulous diarrhœa, especially a few days before the weighing day. When they get lighter, they step down from the weighing-board with very long faces; if they are improving, they know it already.

In the hotels there are every comfort and necessary for an invalid. The objection to them is the gloomy tone produced by so many sick people living together, many of them harping and discontented to the last degree; the fatiguing length of the table-d'hôtes; and the situation of the houses, in the heart of Funchal.² The rents of the *quintas* are much fallen of late; and good Portuguese servants are easy to be had.

The best cases for Funchal are advanced cases, where the mucous membrane is highly irritable, or where cavities have already formed. The soft equable humid air acts in a soothing manner upon the diseased and ulcerated surfaces. They do not miss cool and bracing air, because such air they could not have borne. I have sometimes been astonished to see a patient complaining of very little uneasiness,

¹ The fact of hereditary transmission is merely given in order to state the case as fairly as possible without laying any more stress upon it than Dr Walshe or Dr E. Smith are disposed to do.

² Holloway's Hotel is out of Funchal, and well situated to one who can afford conveyance, being on the slope of a steep hill.

and, on putting my stethoscope to the chest, to find it full of moist râles. Even supposing they do not prolong their existence, they close it with much less suffering than during the winter in Great Britain.

There is little doubt that Teneriffe is a less relaxing climate than Funchal; and if there were a good boarding-house at a considerable elevation, it would be useful for some cases; but at present there is poor accommodation, bad food, and, owing to the very strict quarantine, patients sent from England are often forced to go on to Sierra Leone, where they have a chance of adding yellow fever and liver disease to the complaints they already bring with them.

These vague speculations about a dry climate being good for one with copious expectoration, a moist one for those with dry tubular breathing, as well as generalizations about the *strictum* and the *laxum*, are often delusive guides.

I have seen several old cases of cure at Funchal. In all, the patients belonged to the nervous temperament, and were fond of heat. Two of them assured me that cold depressed their spirits and impaired their appetite. One case of seven years' duration was always worst during the coldest weather. I have seen other advanced cases where there is reason to believe that the climate prolonged their existence. Some people who had been at Algiers preferred Madeira, others the reverse. The absence of dust and malaria is in favour of Funchal. Algiers is more bracing, fitter for early cases. Egypt is a quite different climate, apparently much superior to both.

Although I have spent three winters and two summers in the south of France, I feel considerable hesitation in making any comparative appreciation of places of winter resort. The subject, besides, is too wide and too serious to be discussed in a few sentences. Possibly, it would be well for those recommended to seek a milder climate in the winter, to resort in the first case to a dry and bracing one; and if convinced, by rigorous experience, that an increased temperature is desirable, to try the effect of an intermediate climate like Corsica or Malaga; some distance from the sea probably would be an advantage. If the invalid possesses, which unhappily few invalids do, the power of observing carefully and reasoning correctly on his own case and constitution, the knowledge so gained may save him from the tentative recommendations of consulting physicians, which, it must be confessed, are not always justified by experience. He ought also, if going by their advice or consent, especially if a foreign residence is likely to prove a strain on his pecuniary resources, to obtain some definite opinion as to the amount of benefit to be expected. If this were kept in view, many bitter disappointments would be avoided.

Little need be said about a summer residence in Madeira. Few invalids are disposed to stay long in a place where the sources of amusement are so limited; and those who have been there in the winter may form some opinion, or get some information bearing upon their own case. The climate in the hills, to which invalids

resort, is much of the same character as what is met with in the winter at Funchal; otherwise, I do not care about reproducing information which I cannot check by my own experience. The opinion of invalids is little to be trusted. They almost always judge everything from their own cases. A good many invalids stayed over the summer of 1868, but apparently with little profit. Very few are staying this summer.

A very large proportion of cases coming to Madeira are phthisical; nevertheless, such are not the cases likely to do the climate most credit. Among those suited for its soft and equable air are inflammatory diseases of the larynx and trachea, where relaxation is not a prominent symptom; chronic bronchitis, slow recoveries from pneumonia, cirrhosis, and gangrene of the lungs. Some celebrated Madeira cures have been cases of these two last complaints. Scrofula and rheumatism may not be expected to do well; and the habit of persuading patients returning to England from the coast of Africa with intermittent or remittent fevers, dysentery, and, worst of all, liver disease, to land and stay at Funchal, is most objectionable. Such cases do best in England—in Madeira they fall back or make slow recoveries.

I at first believed that Madeira might be made a place of resort for cases of chronic Bright's disease. The proportion of admissions of Bright's disease of the kidneys (nephrite albumineuse) was roughly computed by a Portuguese physician as one to every eighty in the hospital at Funchal. This is a proportion much higher than what is met with anywhere in India. The ratio of admissions in 1867 for the European Bengal Army¹ was less than one in a thousand, and even this small proportion was never reached either in the jails or in the native army; the highest being in the Punjab frontier force, where there were ten hospital admissions and no deaths to 12,661 admissions, on a strength of 10,000. In Central India, Bengal, and Assam forces, there were no admissions at all to a strength of above 13,000. In the course of my small practice at Funchal, I have seen one case of waxy kidney and one of albuminuria. If it is thought desirable to relieve the kidneys by increasing the action of the skin, a dry as well as a warm air will be found best to answer this indication. And although it is proved that a high temperature saturated with moisture, by checking the exhalation of vapour from the lungs, induces copious perspiration, this effect is not increased in any sensible degree, according to Mr Edwards,² till the temperature rises above 68°. There is thus no warrant, either theoretical or practical, for sending patients to a moist climate with a temperature below 68° like Madeira. If benefit is to be got from a change of climate, it must be got from a hot country

¹ Annual Returns of the European and Native Armies of the Jail Population of the Bengal Presidency for 1867, compiled by Dr Bryden.

² Quoted by Dr Mason, *op. cit.*, p. 140.

like India, or, perhaps better still, a dry and hot country like Upper Egypt or Peru.

Pluming themselves upon the favourable verdicts of physicians of a bygone generation, when our views on the nature and effects of climate upon disease were more unripe than at present, the advocates of Madeira have tried to allure to its distant shores all cases of phthisis, and other chest complaints, not to mention several other disorders, especially bidding for those cases which are still in the earlier and more curable stages. Such claims have now been rejected by the best of the medical profession, and have not been sustained by the voice of the non-medical public. Continually praised, scarcely ever attacked, the climate of Madeira is still sinking in reputation; and as long as it is cried up as a mere "health resort," it will probably continue to sink. In trying to the best of his power to distinguish those cases which may be expected to derive benefit from its climate, and to keep away all other cases, the physician is trying to perform at once a service to mankind and to those interested in the prosperity of Funchal,—a service, nevertheless, which he must perform without any hope of gratitude or reward, save the pleasure attending the finding and telling of the truth, and the endeavour to save human life.